

REMARKS

Claims 1-29 are pending in the application. Claim 17 has been canceled without prejudice or disclaimer. Claims 1, 19, 23 and 24 have been amended. No new matter has been added. Reconsideration of the claims is respectfully requested.

Applicants note the Examiner's attachment regarding Applicant's submission of informal drawings with the application. Applicants will provide formal drawings upon allowance of the application.

Provisional Double Patenting Rejections

Claims 1 and 19 were provisionally rejected under the judicially created doctrine of obvious-type double patenting as being unpatentable over claims 1, 26 and 34 of copending application 10/014,278. Claims 20 and 29 were provisionally rejected under the judicially created doctrine of obvious-type double patenting as being unpatentable over claims 20-21 of copending application 10/014,278.

Claims 21, 23 and 24 were provisionally rejected under the judicially created doctrine of obvious-type double patenting as being unpatentable over claim 17 of copending application 09/871230, in view of Ackerman et al. (U.S. Patent No. 6,186,937) (Ackerman).

Applicant notes that these double patenting rejections are provisional. These rejections will not be addressed until one of the applications, either the applications used as the basis for the rejections, or the present application, is issued as a patent. At that time, Applicant will be able to properly address the provisional double patenting rejection according to MPEP § 804. Applicant does not acquiesce to the reasons stated for the provisional double patenting rejections.

Rejection under 35 U.S.C. § 112

Claims 13-17 are rejected under 35 U.S.C. § 112 second paragraph for being indefinite for failing to particularly point out and distinctly claim the subject matter which is the invention. This rejection is moot in view of the amendment to claim 1. It is believed that all claims comply with 35 U.S.C. § 112.

Rejection under 35 U.S.C. § 102

Claims 1-6, 9-10, 19-20, 22, 25-26 and 28-29 are rejected under 35 U.S.C. §102(e) as being anticipated by Ackerman et al. (U.S. Patent 6,186,937) (Ackerman). Ackerman teaches a method and device for obtaining a desired phase of optical characteristic from a Fabry-Perot (FP) etalon using multiple optical detectors (abstract). In particular, Ackerman teaches an optical signal (230) from a light source (200) being collimated in a collimating lens (300). The collimated optical signal is incident on the FP etalon (110). An optical array (120) having a plurality of detectors (130) are provided at the exit surface of the etalon. The spacing between the detectors depends in part on the number of detectors provided in the detector array and the amount of discrimination required (col. 4, lines 21-65).

The invention of amended independent claim 1 is directed to a method of stabilizing an operating wavelength of a laser. The method comprises illuminating an optical element with light output from the laser to produce an interference pattern, where the optical element is a non-parallel etalon. At least three different portions of the interference pattern are detected to generate at least three respective detection signals. A feedback signal is generated using the at least three detection signals. The operating wavelength of the laser is adjusted in response to the feedback signal.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Therefore, all claim elements, and their limitations, must be found in the prior art reference to maintain a rejection based on 35 U.S.C. §102. Applicant respectfully submits that Ackerman does not teach every element of claim 1, and therefore fails to anticipate claim 1.

In particular, Ackerman teaches only the use of a Fabry-Perot etalon, and fails to teach the use of a non-parallel etalon.

Accordingly, since Ackerman fails to teach all the elements of amended claim 1, claim 1 is not anticipated by Ackerman.

Amended independent claim 19 is directed to a system for stabilizing an operating wavelength of a laser, comprising means for illuminating a non-parallel etalon with light output from the laser to produce an interference pattern, means for detecting at least three different portions of the interference pattern to generate at least three respective detection signals, means for generating a feedback signal using the at least three detection signals, and means for adjusting the operating wavelength of the laser in response to the feedback signal.

Like claim 1, Ackerman fails to teach illuminating a non-parallel etalon. Accordingly, claim 19 is also not anticipated.

Claim 20 is directed to a method of monitoring light output by a laser. The method includes producing a periodic optical interference pattern by illuminating a non-parallel etalon with the light output by the laser and detecting at least three different portions of the periodic optical interference pattern to generate at least three respective detection signals. A power signal indicative of the output power from the laser is generated using the at least three detection signals.

Claim 29 is directed to a system for monitoring light output by a laser. The system includes means for producing a periodic optical interference pattern and means for detecting at least three different portions of the periodic optical interference pattern to generate at least three respective detection signals. The system also includes means for generating a power signal indicative of output power from the laser using the at least three detection signals.

Ackerman fails to teach all the elements of claims 20 and 29. In particular, Ackerman fails to teach that at least three signals generated from the optical interference pattern are used to generate a power signal indicative of the output power from the laser. Ackerman is completely silent as to using the optical phase signal detected by his detector array to determine the output power of the laser. Instead, with reference to FIG. 4, and col. 5, line 62 - col. 6, line 22, Ackerman teaches a detection system that uses a power detector (150) that is separate from the discriminator (100). The discriminator includes the Fabry Perot etalon and the optical detector array. Ackerman teaches that his discriminator is unable to detect a change of power at constant frequency and, therefore, uses a separate power monitor in parallel with the discriminator. The signal

from the power monitor is then used to normalize the signals receive from the discriminator.

In contrast to Ackerman, the present invention sets forth a method for monitoring the output power using the signals generated from the same detectors that monitor the interference pattern - for example see page 17, line 12 - page 18, line 11.

Since Ackerman fails to teach all the elements of independent claims 20 and 29, these claims are not anticipated and are allowable.

Dependent claims 2-6, 9, 10, 22, 25, 26 and 28, which are dependent from independent claims 1 and 20, were also rejected under 35 U.S.C. §102(e) as being unpatentable over Ackerman. While Applicants do not acquiesce with the particular rejections to these dependent claims, it is believed that these rejections are moot in view of the remarks made in connection with independent claims 1 and 20. These dependent claims include all of the limitations of the base claim and any intervening claims, and recite additional features which further distinguish these claims from the cited references. Therefore, dependent claims 2-6, 9, 10, 22, 25, 26 and 28 are also in condition for allowance.

Regarding claim 2, although an FP etalon operates by reflecting light between the front and back surfaces, one of ordinary skill in the art would clearly understand that reflecting the interference pattern from an etalon to the detector means that the interference pattern is reflected from the etalon rather than being transmitted through the etalon to the detector. Therefore, the interference pattern used in the method propagates from the same side of the etalon on which the light is originally incident, rather than from the "back side" of the etalon, on which the light is not originally incident.

Regarding claims 4, 5, and 26, Applicant respectfully disagrees that Ackerman's disclosure inherently teaches the claimed relationships. Ackerman makes no comments regarding the relationship between the period of the interference pattern and the spacing between detector elements. Further, with regard to claim 5, Applicant denies that a detector array would "inherently" have a detector element spacing of P/n , where P is the period and n is an integer equal to the number of detector elements.

Regarding claim 6, Applicant further disagrees that Ackerman's disclosure of additional detectors anticipates the claimed invention. According to claim 6, there exist

additional corresponding detector elements positioned are the same phase in the interference pattern as the “at least three detector elements”. There is nothing in Ackerman to suggest that this is the case. For this condition to occur, there exists a specific relationship between the period of the interference pattern and the spacing between detector elements. Ackerman is silent as to such a relationship and there is nothing inherent about it.

Rejections under 35 U.S.C. § 103

Claims 7, 8, 11-16, 18 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ackerman et al.

Three criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference, or combination of references, must teach or suggest all the claim limitations. MPEP § 2142. Applicant respectfully traverses the rejection since the prior art fails to disclose all the claim limitations, and that the modifications proposed by the Examiner are not well known.

It is stated in the Office Action that Ackerman discloses applications method of using at least three detection signals, except without expressly disclosing summing at least three detector signals. It is also stated that Ackerman teaches that more than one of the plurality of detectors may advantageously detect a useful part (248) of one of a spectra [sic], and that it would have been obvious to sum all detectors for measuring power of one of a spectra to obtain a power measurement.

Applicant respectfully disagrees.

Claim 7 is directed to the respective additional detector elements of claim 6, where the detection signals from the each of the at least three detectors and their respective additional detector elements are summed to form summed signals for each phase portion of the interference pattern. This is discussed, for example at page 17, lines 3-11 with reference to FIG. 5. Ackerman fails to teach the summing of signals from

different detector elements that correspond to the same phase portion of the interference pattern.

Claims 8 and 27 are directed to summing the signals from the at least three detection elements to produce a signal indicative of a power level of the laser. While the Examiner indicates that this would be obvious, Applicant strongly disagrees. In fact, Ackerman teaches the use of a separate power monitor (FIG. 4, element 150), and makes no mention of the ability to make a power measurement using only the detector array.

It is pointed out that the omission of an element and the retention of its function is an indicia of unobviousness *In re Edge*, 359, F.2d 896, 149 USPQ 556 (CCPA, 1966), MPEP 2144.04.II.B. In this situation, Ackerman teaches the use of a detector array to detect the interference pattern and a separate power monitor to detect the output power. The present invention is directed to the use of at least three detector elements to i) detect the interference pattern and ii) monitor the power. Thus, the inventions of claims 8 and 27 permit the detection of the output power without the use of a separate power monitor. Under the criteria set forth in *In re Edge*, this is not obvious.

Regarding claims 11-16, it is stated in the Office Action that Ackerman does not expressly set disclose summing three power signals and dividing by three (averaging). It is further stated that it would have been notoriously obvious to one of ordinary skill in the art to perform summing or averaging power levels across multiple detectors for providing more consistent data.

Applicant strongly disagrees with the statements in the Office Action. Claim 11 is directed to generating a signal indicative of laser power. Ackerman simply fails to indicate in any way that the signals from his detector array could be used to determine laser power and, in fact, teaches the use of a separate power monitor. See the discussion regarding claim 8 above.

Furthermore, the relationships between the different signals and the method for obtaining useful information therefore, as set forth in claims 11-16 is simply not provided in Ackerman. Applicant strongly disagrees that such relationships are notoriously well known and respectfully requests that the Examiner provides evidence that these relationships, particularly the relationships set forth in claims 12-14, are notoriously well

known for determining the wavelength of a laser from the interference pattern produced by laser light.

Conclusions

In view of the amendments and reasons provided above, it is believed that all pending claims are in condition for allowance. Applicant respectfully requests favorable reconsideration and early allowance of all pending claims.


If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicant's attorney of record, Iain A. McIntyre at 952-253-4110.

Respectfully submitted,

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